CLAIMS

1. A method of forming an assembly of optical components, comprising:

positioning a first component in a mold;

positioning a second component in a mold; and

applying a formable material into the mold to form a waveguide between the first and second components, the waveguide forming an optical path between the first component and the second component.

2. The method of claim 1 in which at least one of the first or second components is an optical fiber or other passive optical component.

3. The method of claim 1 in which at least one of the first or second components includes a laser or other active optical component.

4. The method of claim 1 further comprising removing the first component, the second component, and the waveguide from a mold used to form the waveguide by providing a support structure to support the first component, the second component, and the waveguide as it is removed.

5. The method of claim 4 in which the support structure is adhered to the first component, the second component, and the waveguide.

6. The method of claim 5 in which the support structure is molded onto the first component, the second component, and the waveguide.

7. The method of claim 6 in which providing a support structure includes molding a cladding material to form the support structure.

8. The method of claim 5 in which the support structure includes a sticky surface and in which the support structure is adhered to the first component, the second component, and the waveguide by contacting to the sticky surface.

9. The method of claim 1 further comprising applying a second formable material into the mold to clad the waveguide material.

10. The method of claim 9 in which applying the second formable material includes applying the material to fix the first and second component together in alignment.

11. The method of claim 10 further comprising inserting a substrate element into the mold and in which applying the second formable material includes applying the second formable material to fix the first and second components onto the substrate.

12. The method of claim 9 in which applying the second formable material includes applying the material to form an enclosure or other protecting, supporting or subsequent aligning structure.

13. The method of claim 9 in which a third formable material is applied to form an enclosure or other protecting, supporting or subsequent aligning structure.

14. An optical assembly produced in accordance with the method of claim 1.

15. The optical assembly of claim 14 in which at least one of the first or second components comprises a passive optical component.

16. The optical assembly of claim 14 in which at least one other of first or second component comprises an active component.

17. A method of forming an optical waveguide assembly, comprising:

providing a tool having a pattern to be transferred to an optical waveguide, the tool aligning an optical component relative to the waveguide pattern;

forming the optical waveguide aligned with the optical component by shaping a formable material using the tool; and

hardening the formable material to produce a waveguide aligned with the component.

18. The method of claim 17 in which the component is an optical fiber.

19. The method of claim 17 further comprising applying a formable cladding material over the optical waveguide

20. The method of claim 17 further comprising removing the optical waveguide from the tool by adhering the optical waveguide to a support structure.

21. The method of claim 20 in which adhering the optical waveguide to a support structure includes molding a support structure onto the optical waveguide.

22. The method of claim 20 in which adhering the optical waveguide to a support structure includes contacting a prefabricated molded support structure onto the optical waveguide.

23. The method of claim 20 in which either the support structure or the waveguide is incompletely cured when the optical waveguide is adhered to the support structure.

24. An optical waveguide assembly formed in accordance with the method of claim 17.

25. A mold for forming an optical assembly, the mold including a structure for aligning an optical element with a waveguide and a structure for defining the shape of the waveguide.

26. A method of in-situ forming of an optical assembly, comprising:

positioning one or more optical components in a mold; and

inserting a formable material into the mold, the formable material taking on in part the shape of the mold to form a light-carrying portion of the assembly.

27. A formed-in place molded optical assembly comprising:

one or more optical components; and

a light-carrying waveguide material formed in contact with the optical component for transmitting light to or from at least one of the one or more optical components.

28. The assembly of claim 27 in which the optical component includes an optical fiber.

29. The assembly of claim 27 in which the molded optical assembly includes a fiber termination ferrule, a connector, or a backplane.

30. The assembly of claim 27 in which the optical component includes a passive optical component.

31. The assembly of claim 30 in which the passive optical component includes a lens, a filter, or a grating.

32. The assembly of claim 27 in which the optical component includes an active optical component.

33. The assembly of claim 32 in which the active optical component includes an optical transceiver, optical switches, optical repeaters, lasers, detectors, or a MEMS device.

34. A method of terminating an optical fiber, comprising:

inserting the optical fiber into a mold; and

inserting into the mold a formable light-carrying material, the light carrying material contacting the optical fiber and forming a light path to or from the optical fiber.

35. The method of claim 34 in which the light path includes two ends, a proximal end carrying light to or from the optical fiber and a distal end and further comprising forming the distal end into a connecting structure.

36. The method of claim 35 in which the connecting structure includes a surface that is sufficiently smooth to reduce light scattering.

37. The method of claim 36 in which the surface roughness is less than 600 nanometers.

38. The method of claim 35 in which the connecting structure has an optical axis and in which a connecting surface is oriented at an angle of between 0 degrees and 55 degrees from a normal to the optical axis.

39. An optical fiber terminated in accordance with claim 34.

40. A method of forming an optical waveguide assembly, comprising:

providing a tool having a pattern providing a precision alignment between optical components;

forming an optical waveguide aligned with and connecting the optical components by shaping a formable material using the tool; and

hardening the formable material to produce a waveguide aligned with the components.

41. An optical assembly manufactured in accordance with claim 40.

42. A set of optical assemblies connectable without active alignment, each of the optical assemblies including:

an optical element;

a waveguide molded into contact with the optical element; and

a connector portion for mating with a complementary connector of another optical assembly in the set of optical assemblies.

43. The set of optical assemblies of claim 42 in which the connector portion is molded onto the waveguide.

44. The set of optical assemblies of claim 42 in which the waveguide has a refractive index approximately equal to that of a connecting portion of the optical element, thereby eliminating the requirement to polish the connecting portion of the optical element.

45. A method of forming an optical waveguide, comprising:

providing a precision mold having there in a cavity corresponding to the desired shape of the waveguide;

inserting a formable material into the cavity of the precision mold, the formable material taking on at least in part the shape of the cavity to form the waveguide;

hardening the waveguide; and

removing the waveguide from the precision mold.

46. The method of claim 45 in which removing the waveguide from the precision mold includes providing a support structure to adhere to the waveguide as it is removed.

47. The method of claim 46 in which providing a support structure to adhere to the waveguide includes molding a support structure onto the waveguide.

48. The method of claim 47 in which molding a support structure onto the waveguide includes molding a cladding material onto the waveguide.

49. The method of claim 46 in which the support structure includes a sticky surface and in which the support structure is adhered to the waveguide by contacting to the sticky surface.

50. The method of claim 45 further comprising applying a second formable material into the mold to clad the waveguide material.

51. A waveguide formed in accordance with the method of claim 45.